7 November 2011

Off-Site Soil Gas Survey Report
Former CENCO Refinery
12345 Lakeland Road, Santa Fe Springs, CA

SLIC No. 0318, ID No. 2040071
CAO 97-118

Prepared on Behalf of

Isola Law Group, LLP
Lodi, California

Prepared for

Regional Water Quality Control Board
Los Angeles Region

Prepared By

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1.0 INTRODUCTION

On behalf of Isola Law Group, LLP, Murex Environmental Inc. (Murex) has prepared this *Off-Site Soil Gas Survey Report* for Lakeland Development Company (Lakeland) for its former refinery located at 12345 Lakeland Road in Santa Fe Springs, California (Site; see **Figure 1**).

1.1 Purpose

The main objectives of the soil vapor survey were to investigate the extent of volatile organic compounds (VOCs) extending off-site to the west and south of the CENCO Refinery Site boundary and to delineate the horizontal and vertical VOC impacts in the shallow vadose zone soil.

1.2 Background

In the February 2, 2007 letter from the Los Angeles Regional Water Quality Control Board (LARWQCB), titled "Requirement for Workplan Pursuant to California Water Code (CWC) Section 13267 – CENCO Refinery – 12345 Lakeland Road, Santa Fe Springs, California (SLIC Case No. 0318, SLIC ID No. 2040071, CAO 97-118), an off-site soil vapor survey was ordered to supplement information obtained in previous investigations that had occurred on-site. Arcadis, on behalf of Lakeland, submitted the first workplan on March 29, 2007 which proposed sampling on the western properties only. After discussing the proposed approach with the LARWQCB, a revised workplan, titled *Revised Off-Site Soil Gas Workplan*, was submitted on August 14, 2007 which added several sampling locations along the southern property boundary.

The LARWQCB approved this revised workplan in their January 11, 2008 letter, "Conditional Approval of Workplans for Soil Gas Survey, Free Phase Petroleum Hydrocarbon Investigation, Supplemental Soil Investigation, and Baseline Risk Assessment – CENCO Refinery – 12345 Lakeland Road, Santa Fe Springs, California (Site Cleanup Program Case No. 0318, Site ID No. 2040071, CAO 97-118." The work plan was approved under the condition that additional sampling was to be conducted on properties to the south of the former CENCO refinery, including the Metropolitan State Hospital.

An LARWQCB letter dated July 21, 2010, titled "Requirements for Subsurface Investigation and Cleanup Pursuant to Cleanup and Abatement Order (CAO) No 97-118, Former Powerine/CENCO Refinery," reiterated the requirement to perform the soil gas survey.

As ordered in the July 21, 2010 LARWQCB letter, Murex submitted the *Addendum to the Revised Off-Site Soil Gas Survey Workplan* on September 3, 2010. This workplan received approval from LARWQCB in their April 13, 2011 letter, titled "Approval of Work Plan for Off-Site Soil Gas Survey, Pursuant to California Water Code Section 13304 Cleanup and Abatement Order No. 97-118 (**Appendix A**).

Acquiring access permission to perform sampling on the properties located to the west required an extended period of time. Murex completed the soil gas survey on the properties to the south while engaging assistance from the LARWQCB to gain access from western property owners. The LARWQCB also provided the August 30, 2011 letter, titled "Approval of Time Extension for Submittal of Report of Soil Gas Survey Pursuant to California Water Code Section 13304 Cleanup and Abatement Order No. 97-118" (**Appendix A**). This letter approved a deadline extension for the submittal of the technical report of findings to November 15, 2011.

1.3 Site Description and History

The site is approximately 55 acres in size and is bordered to the north by Florence Avenue, to the south by Lakeland Road, and to the east by Bloomfield Avenue (**Figure 1**). The Site is bordered on all sides by commercial and industrial properties. The site was operated as an oil refinery from the 1930s until July 1995. Oil-production-related structures such as ponds and aboveground holding tanks may have also been located onsite during these years (Haley & Aldrich, Inc. [Haley & Aldrich], 2005). The refinery ceased operations in July 1995. Since then, refinery structures, such as tanks, overhead piping, and other infrastructure, have been removed in stages. The remaining refinery structures are scheduled to be removed for reuse elsewhere or recycling prior to the redevelopment of the property for commercial/industrial use.

Previous refining operations included processing crude oil into several grades of fuel including kerosene, leaded gasoline and aviation fuel, unleaded gasoline, jet fuel, high and low-sulfur diesel, fuel oil, and petroleum coke. Soil and groundwater quality beneath and in proximity to the site have been impacted by accidental spills. Soil and groundwater investigations are being conducted pursuant to the CAO.

1.4 Site Physical & Chemical Background Data

The August 2007 workplan by Arcadis, titled *Revised Off-Site Soil Gas Survey Workplan,* contains pertinent Site data, including:

- Site Operational History

- Local and Regional Geology and Hydrogeology
- Summary of the Results of Previous Soil and Soil Gas Analysis

2.0 SOIL GAS SAMPLING PROCEDURES

The following section describes the procedures employed to complete the off-Site soil gas survey, which included pre-field activities, description of applicable guidance, installation and sampling techniques, probe abandonment, and waste management.

2.1 Scope of Work

The scope of this project was to install 2 soil gas probes at 49 locations off-site, one at 5 ft-bgs and one at 10 ft-bgs. Purge tests were to be conducted at 1, 3 and 7 volumes to determine optimum purge volume in subsequent sampling. Samples retrieved from each soil gas probe would be analyzed on-site in a mobile laboratory for VOCs via EPA Method 8260B. Confirmation samples would be collected in summa canisters for laboratory analysis via EPA Method TO-15.

2.2 Pre-Field Activities

2.2.1 Access Agreements

Soil gas sampling to the south involved two properties, the Metropolitan State Hospital and the "Coaster". Lakeland worked with these property owners to update existing access agreements to allow for the soil gas sampling.

To the west, access was required on the properties of four (4) land owners. This was an extended process and caused Lakeland to request a time extension on the due date of the technical report. The access agreements were eventually reached after the LARWQCB intervened on Lakeland's behalf.

2.2.2 Mark-Out

Murex visited the Site to mark soil gas locations in white paint. Several proposed locations were moved slightly for safety or access reasons. The most notable move was sampling location OS-V038. **Figure 2** shows a site plan of all final soil gas sampling locations.

2.2.3 Utility Clearance

Murex notified Underground Services Alert (USA) of the impending subsurface work at least one week prior to the start of sampling, and renewed the work tickets every two weeks, as required, as the sampling continued over the summer. USA marked the locations of public and private utilities on public property, and noted where utilities enter private land. In addition, prior to the start of sampling, a utility location service was hired to search for underground utilities in the vicinity of the marked boring locations on private property. At that time, several of the proposed locations were adjusted slightly to avoid

identified utilities or suspected utilities. Also at this time, certain proposed locations were selected to be installed using hand auger rather than direct push boring techniques, where locations were close to suspected utilities but could not be feasibly moved to a safer location.

2.3 Applicable Guidance

The soil gas sampling activities were conducted in accordance with the Advisory on Active Soil Gas Investigations dated 28 January 2003, jointly issued by the Department of Toxic Substance Control (DTSC) and LARWQCB and the DTSC Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air, revised 7 February 2005. The standard operating procedures for compliance with this guidance are included in the "Soil Vapor Standard Operating Procedures Fulfilling CA-EPA (DTSC) Soil Gas Advisory," dated December 2008 (See **Appendix B**).

2.4 Probe Installation and Sampling Procedure

Soil gas samples were acquired from temporary probes installed at approximately 5 (Zone A) and 10 (Zone B) feet below ground surface (ft-bgs).

The installation of the temporary probes required two different installation/equilibration procedures. In locations where utility clearance surveying was successfully conducted with no interference and where there were no indications of underground utilities at the proposed location, soil gas points were advanced using a 1.5-inch Geoprobe® direct-push rod. After installation, probes were allowed to equilibrate for approximately 30 minutes prior to purging, leak testing, or sampling.

In areas inaccessible to the truck-mounted Geoprobe® rig, areas where underground pipelines were known to be located in close proximity, where concrete surface cover exceeded 12-inches, or in areas where underground utility surveying techniques were hampered by magnetic interference, soil gas probes were installed in boreholes created using 3-inch hand augers. After probe and sand pack installation, and setting and hydration of bentonite chip seals, probes were allowed to equilibrate for approximately 48 hours prior to purging, leak testing, or sampling.

Prior to sample collection, leak tests were performed at each location. A liquid leak compound detection procedure was used. This procedure employed 1,1-diflouroethane (1,1-DFA) administered under a shroud, in order to detect if there were leaks in the probe seal construction by assessing whether ambient air containing 1,1-DFA has been entrained into the sample.

At the first location (OS-V040) on the first day of sampling (June 27, 2011), a purge test was conducted on the Zone B (i.e., the 10 ft-bgs) probe to determine the optimal soil gas purging volume. The probe was purged of 1, 3, and 7 volumes, and each of these samples was analyzed for volatile organic compounds (VOCs) by Environmental Protection Agency (EPA) method 8260B. Purge test results can be found in **Table I**. Concentrations for all contaminants, including TPHg, were non-detect, so the median of 3 purge volumes was used in further sampling.

A second purge test was conducted on June 30, 2011 at probe OS-V001, Zone B. Again, all tests results were non-detect for all compounds of concern. Therefore, a purge volume of 3 was used in the remaining sampling locations.

Samples were collected from the Zone A (5 ft-bgs) and Zone B (10 ft-bgs) probes at every location. Each sample was collected using a syringe and immediately transferred to the mobile laboratory and analyzed for VOCs by USEPA Method 8260B.

Duplicate samples, which assess the precision of the laboratory analyses, were collected from the following probes:

- OS-V007 (Zone B), OS-V012 (Zone A), OS-V021 (Zone A), OS-V022 (Zone B), OS-V028 (Zone B), OS-V030 (Zone B), OS-V032 (Zone B), OS-V042 (Zone B), OS-V046 (Zone B)

This represents a duplicate frequency equal to approximately 10% relative to the total number of wells sampled. The duplicates followed the same analytical protocols as their respective primary samples.

In addition to the duplicates listed above, several confirmation samples were collected in summa canisters as well and analyzed for VOCS by USEPA Method TO-15 at an offsite laboratory. These included:

- OS-V001 (Zone A), OS-V010 (Zone A), OS-V016 (Zone A), OS-V022 (Zone A), OS-V033 (Zone B), OS-V042 (Zone B)

2.5 Probe Abandonment and Waste Disposal

After the conclusion of soil vapor sampling, the probes were abandoned. The sample tubing was cut below the ground surface and capped with a screw. The remaining void was

filled with fluid bentonite slurry until slightly below grade. The remaining depression was filled with concrete or asphalt patch material finished flush to grade.

Investigative-derived wastes were collected in Department of Transportation (DOT)-approved 55-gallon drums and were stored on-Site pending waste profiling. One sample was collected for waste profiling purposes. The sample was analyzed for VOCs, total petroleum hydrocarbons, Title 22 metals, and PCBs. Following profiling, the waste was transported off-Site and disposed of by a California-licensed transportation and disposal provider.

3.0 RESULTS AND DISCUSSION

The active soil gas survey yielded detections of TPHg and gasoline-related VOCs. The majority of these detections occurred on the Coaster property to the south, across Lakeland Road. A summary of all analytical results can be found in **Table I**. Laboratory reports are located in **Appendix C**. The results of the survey are shown in graphic format depicting TPHg and benzene concentrations, separately, for each of the 5 ft-bgs and 10 ft-bgs sample probes, in **Figures 3, 4, 5, and 6**. Also shown in these figures, for comparison and correlation, are the corresponding TPHg and benzene concentration contours for groundwater, which were measured in August 2011.

3.1 Benzene

Benzene was detected in the active soil gas testing in 15 unique probes out of 83; 7 occurrences in Zone A (5 feet-bgs) and 8 in Zone B (10 ft-bgs). **Figure 3** depicts the benzene concentrations at 5 feet-bgs. Benzene concentrations at 10 ft-bgs are depicted in **Figure 4**.

In Zone A, benzene was detected in the following samples:

- OS-V012-A, OS-V012-A (Dup), OS-V020-A, OS-V021-A, OS-V021-A (Dup), OS-V033-A, OS-V034-A, OS-V036-A, OS-V037-A

In Zone B, benzene detections were found in the following samples:

- OS-V016-B, OS-V020-B, OS-V021-B, OS-V029-B, OS-V033-B, OS-V034-B, OS-V036-B, OS-V037-B

Along the Site property line, benzene was detected once in Zone A at 770 ug/L and ranged from 0.0034 to 0.0044 ug/L in Zone B. On the properties west of the Site, benzene detections ranged from 0.056 ug/L to 1.4 ug/L in Zone A and from 0.11 to 0.12 ug/L in Zone B. On the Coaster property to the south, benzene detections ranged from 0.16 to 5.1 ug/L in Zone A and from 4.8 to 200 ug/L in Zone B. Benzene was not detected in any probes located on the Metropolitan Hospital property.

In **Figures 3** and **4**, the benzene concentration contours in groundwater have been overlayed on the site map showing soil gas data points for 5 ft-bgs and 10 ft-bgs, respectively. Detections from the active soil gas survey do not appear to correlate with the benzene concentrations in groundwater.

3.2 Gasoline Compounds (TPHg)

TPHg was detected in the active soil gas testing in 20 unique sampling locations; 8 in Zone A (5 feet-bgs) and 12 in Zone B (10 ft-bgs). **Figure 5** depicts the TPHg concentrations at 5 feet-bgs. TPHg concentrations at 10 ft-bgs are depicted in **Figure 6**.

In Zone A, TPHg was detected in the following samples:

- OS-V005-A, OS-V008-A, OS-V0031-A, OS-V033-A, OS-V034-A, OS-V036-A, OS-V037-A, OS-V042-A

In Zone B, TPHg detections were found in the following samples:

- OS-V005-B, OS-V008-B, OS-V023-B, OS-V029-B, OS-V030-B, OS-V031-B, OS-V032-B, OS-V033-B, OS-V034-B, OS-V036-B, OS-V037-B, OS-V042-B

Along the Site property line, TPHg was detections ranged from 1.2 ug/L to 1,900 ug/L in Zone A and from 1,400 ug/L to 30,000 ug/L in Zone B. On the properties west of the Site, TPHg detections ranged from 1.8 ug/L to 340 ug/L in Zone A and from 1,100 ug/L to 2,900 ug/L in Zone B. On the Coaster (former Lakeland) property to the south, TPHg detections ranged from 820 ug/L to 52,000 ug/L in Zone A and from 1,600 ug/L to 99,000 ug/L in Zone B. TPHg was detected once on the Metropolitan Hospital property at 3,400 ug/L.

On **Figures 5** and **6**, the TPH concentration contours in groundwater from the CENCO 3rd quarter groundwater monitoring report have been overlayed on the CENCO site map with the active soil gas detections in 5 ft-bgs and 10 ft-bgs, respectively. TPHg concentrations detected in soil gas do not appear to correlate to those found in groundwater.

3.3 Other Compounds Detected

Tetrachloroethylene (PCE) was detected in two field samples at concentrations of .13 µg/L and .61 µg/L. It was also detected in two confirmation samples at concentrations of .0075 µg/L and .011 µg/L.

Vinyl Chloride (VC) was detected at only one sampling location at a maximum concentration of .23 µg/L.

1,1-Dichloroethene (1,1-DCE) was detected in one location, OS-V021-A, at a concentration of 1.0 µg/L.

1,3,5-Trimethylbenzene (1,3,5-TMB) was detected in two confirmation samples at concentrations of .01 and .0062 µg/L.

1,2,4-Trimethylbenzene (1,2,4-TMB) was detected within a range of .007 µg/L and 98 µg/L.

Toluene was detected within a range of .0056 and 2,000 µg/L. Ethylbenzene was detected in five locations ranging in concentration from .0044 µg/L to 260 µg/L. Xylene was also detected in five locations, ranging in concentration from .0099 µg/L to 1,200 µg/L. In all three of these compounds, the maximum concentrations were detected at 10 ft-bgs, but the highest number of detections found was at 5 ft-bgs.

N-propylbenzene was detected in one location at a concentration of 27 µg/L. Isopropylbenzene (ISO-P) was detected in one location at a concentration of 1.0 µg/L. Methylene chloride (MC) was detected in one location at a concentration of .0036 µg/L.

Chloroform was detected in three samples ranging from .17 µg/L to .59 µg/L.

3.4 Detection Limit Interference

The presence of TPHg in samples collected during this soil gas survey have a direct impact upon the reporting of other contaminants. TPHg causes interference in laboratory equipment which drives up the detection limits of other constituents. Therefore, contaminant levels which may have been detected in samples without TPHg present are potentially masked by a higher reporting limit.

In all cases where confirmation samples produced detections where active sampling did not, the detection in the confirmation sample was at a concentration below the reporting limit in the active sampling test. Additionally, concentrations of all contaminants detected at a sampling location in both the active soil gas survey and confirmation samples were within acceptable range of one another.

4.0 CLOSING

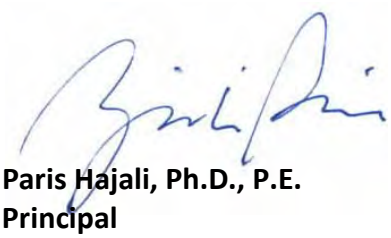
I certify under penalty of law that this document and all enclosures were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. The information contained herein is, to the best of my knowledge and belief, true, accurate and complete, however, is reliant upon public agency records, which could be incomplete or inaccurate beyond our control.

Should you have any questions or concerns regarding the material herein, please do not hesitate to contact the undersigned at (714) 508-0800.

Sincerely,

MUREX ENVIRONMENTAL, INC.

Jeremy R Squire, P.E.
Senior Engineer



Paris Hajali, Ph.D., P.E.
Principal

5.0 REFERENCES

ARCADIS. 2007. *Revised Off-Site Soil Gas Workplan, Former CENCO Refinery, 12345 Lakeland Road, Santa Fe Springs, California.* Prepared for Isola Law Group, LLP. August 14.

MUREX. 2011. *Third Quarter 2011 Groundwater Monitoring Report, Former CENCO Refinery, 12345 Lakeland Road, Santa Fe Springs, California.* Prepared for Isola Law Group, LLP. October 14.

MUREX. 2010. *Addendum to the Revised Off-Site Soil Gas Survey Workplan, Former CENCO Refinery, 12345 Lakeland Road, Santa Fe Springs, California.* Prepared for Isola Law Group, LLP. September 3.

Table I
Summary of Total Petroleum Hydrocarbon (TPH) and VOC Results
Former CENCO Refinery
Santa Fe Springs, CA

Sample ID	Sample Depth (feet bgs)	Sample Date	TPH-g	PCE	TCE	1,1-DCE	1,3,5-TMB	1,2,4-TMB	VC	B	T	E	X	nPRO	CBNZ	ISO-P	MC	NAP	DIPE	MTBE	TBA	Chloroform
All units in µg/L																						
OS-V001-A	5	7/1/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V001-A (CONF)	5	7/12/2011	**1.2**	<0.0069	<0.0055	<0.004	<0.005	**0.007**	<0.0026	**0.0044**	**0.0056**	<0.0044	**0.0099**	NA	<0.0047	NA	<0.0035	NA	<0.0042	<0.0037	<0.0061	<0.005
OS-V001-B (1PV)	10	6/30/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V001-B (3PV)	10	6/30/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V001-B (7PV)	10	6/30/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V002-A	5	7/13/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V002-B	10	7/13/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V003-A	5	7/13/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V003-B	10	7/13/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V004-A	5	7/11/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V004-B	10	7/11/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V005-A	5	7/11/2011	**340**	<1	<1	<5	<5	<5	<0.40	<1	<10	<5	<5	<5	<1	<5	<5	<1	<10	<5	<50	<1
OS-V005-B	10	7/11/2011	**2,900**	<4	<4	<20	<20	<20	<1.6	<4	<40	<20	<20	<20	<4	<20	<20	<4	<40	<20	<200	<4
OS-V006-A	5	7/11/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V006-B	10	7/11/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V007-A	5	7/12/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V007-B	10	7/12/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V007-B (DUP)	10	7/12/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V008-A	5	7/12/2011	**1,900**	<1	<1	<5	<5	<5	<0.40	<1	<10	<5	<5	<5	<1	<5	<5	<1	<10	<5	<50	<1
OS-V008-B	10	7/12/2011	**6,000**	<2	<2	<10	<10	<10	<0.80	<2	<20	<10	<10	<10	<2	<10	<10	<2	<20	<10	<100	<2
OS-V009-A	5	7/12/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V009-B	10	7/12/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V010-A	5	7/12/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V010-A (CONF)	5	7/12/2011	**2.3**	**0.0075**	<0.0055	<0.004	<0.005	**0.012**	<0.0026	**0.0034**	**0.0081**	**0.0044**	**0.0219**	NA	<0.0047	NA	<0.0035	NA	<0.0042	<0.0037	<0.0061	<0.005
OS-V010-B	10	7/12/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V011-A	5	6/30/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V012-A	5	6/30/2011	<200	<0.10	<0.10	**1.0**	<0.50	<0.50	**0.21**	**1.4**	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V012-A (DUP)	5	6/30/2011	<200	<0.10	<0.10	**1.0**	<0.50	<0.50	**0.23**	**1.4**	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V016-A	5	9/20/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V016-A (CONF)	5	9/20/2011	**1.8**	**0.011**	<0.0055	<0.004	**0.0062**	**0.036**	<0.0026	**0.095**	**0.14**	**0.021**	**0.103**	NA	<0.0047	NA	**0.0036**	NA	<0.0042	<0.0037	<0.0061	<0.005
OS-V016-B	10	9/20/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	**0.10**	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V017-A	5	9/20/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V017-B	10	9/20/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V018-A	5	9/20/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V018-B	10	9/20/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V019-A	5	6/30/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V020-A	5	7/12/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	**0.33**	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V020-B	10	7/1/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	**0.11**	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V021-A	5	7/1/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	**0.14**	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V021-A (DUP)	5	7/1/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	**0.12**	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V021-B	10	7/1/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	**0.12**	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V022-A (CONF)	5	7/11/2011	**4.5**	<0.0069	<0.0055	<0.004	**0.01**	**0.04**	<0.0026	**0.056**	**0.27**	**0.038**	**0.176**	NA	<0.0047	NA	<0.0035	NA	<0.0042	<0.0037	<0.0061	<0.005

Table I
Summary of Total Petroleum Hydrocarbon (TPH) and VOC Results
Former CENCO Refinery
Santa Fe Springs, CA

Sample ID	Sample Depth (feet bgs)	Sample Date	TPH-g	PCE	TCE	1,1-DCE	1,3,5-TMB	1,2,4-TMB	VC	B	T	E	X	nPRO	CBNZ	ISO-P	MC	NAP	DIPE	MTBE	TBA	Chloroform
All units in µg/L																						
OS-V022-B	10	7/11/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V022-B (DUP)	10	7/11/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V023-A	5	7/11/2011	<200	<0.40	<0.40	<2	<2	<2	<0.16	<0.40	<4	<2	<2	<2	<0.40	<2	<2	<0.40	<4	<2	<20	<0.40
OS-V023-B	10	7/11/2011	**1,100**	<2	<2	<10	<10	<10	<0.80	<2	<20	<10	<10	<10	<2	<10	<10	<2	<20	<10	<100	<2
OS-V024-A	5	7/11/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V026-B	10	9/20/2011	<200	**0.13**	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V027-A	5	9/20/2011	<200	<0.40	<0.40	<2	<2	<2	<0.16	<0.40	<4	<2	<2	<2	<0.40	<2	<2	<0.40	<4	<2	<20	<0.40
OS-V027-B	10	9/20/2011	<200	<0.40	<0.40	<2	<2	<2	<0.16	<0.40	<4	<2	<2	<2	<0.40	<2	<2	<0.40	<4	<2	<20	<0.40
OS-V028-A	5	9/20/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	**1.0**	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V028-B	10	9/20/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V028-B (DUP)	10	9/20/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V029-B	10	7/1/2011	**30,000**	<4	<4	<20	**40**	**98**	<1.6	**770**	**2000**	**260**	**1200**	**27**	<4	<20	<20	<4	<40	<20	<200	<4
OS-V030-B	10	7/13/2011	**1,400**	<0.40	<0.40	<2	<2	<2	<0.16	<0.40	<2	<2	<2	<2	<0.40	<2	<2	<0.40	<4	<2	<20	<0.40
OS-V030-B (DUP)	10	7/13/2011	**1,400**	<0.40	<0.40	<2	<2	<2	<0.16	<0.40	<2	<2	<2	<2	<0.40	<2	<2	<0.40	<4	<2	<20	<0.40
OS-V031-A	5	6/30/2011	**1,100**	<1	<1	<5	<5	<5	<0.40	<1	<10	<5	<5	<5	<1	<5	<5	<1	<10	<5	<50	<1
OS-V031-B	10	6/30/2011	**8,000**	<4	<4	<20	<20	<20	<1.6	<4	<40	<20	<20	<20	<4	<20	<20	<4	<40	<20	<200	<4
OS-V032-A	5	6/29/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V032-B	10	6/29/2011	**1,400**	**0.61**	<0.20	<1	<1	<1	<0.08	<0.20	<2	<1	<1	<1	<0.20	<1	<1	<0.20	<2	<1	<10	<0.20
OS-V032-A	5	6/29/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V032-B	10	6/29/2011	**1,400**	**0.61**	<0.20	<1	<1	<1	<0.08	<0.20	<2	<1	<1	<1	<0.20	<1	<1	<0.20	<2	<1	<10	<0.20
OS-V033-A	5	6/29/2011	**820**	<1	<1	<5	<5	<5	<0.40	**5.1**	<10	<5	<5	<5	<1	<5	<5	<1	<10	<5	<50	<1
OS-V033-B	10	6/29/2011	**12,000**	<4	<4	<20	<20	<20	<1.6	**88**	<40	<20	<20	<20	<4	<20	<20	<4	<40	<20	<200	<4
OS-V032-B (DUP)	10	6/29/2011	**1,600**	**0.53**	<0.20	<1	<1	<1	<0.08	<0.20	<2	<1	<1	<1	<0.20	<1	<1	<0.20	<2	<1	<10	<0.20
OS-V033-B (CONF)	10	6/29/2011	**14,000**	<6.9	<5.5	<4	<5	<5	<2.6	**200**	**7.6**	<4.4	<8.8	NA	<4.7	NA	<3.5	NA	<4.2	<3.7	<6.1	<5
OS-V034-A	5	6/29/2011	**2,300**	<0.40	<0.40	<2	<2	<2	<0.16	**3.6**	<4	<2	<2	<2	<0.40	<2	<2	<0.40	<4	<2	<20	<0.40
OS-V034-B	10	6/29/2011	**14,000**	<1	<1	<5	<5	<5	<0.40	**40**	<10	<5	<5	<5	<1	<5	<5	<1	<10	<5	<50	<1
OS-V034-B	10	6/30/2011	**12,000**	<2	<2	<10	<10	<10	<0.08	**49**	<20	<10	<10	<10	<2	<10	<10	<2	<20	<10	<100	<2
OS-V035-A	5	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V035-B	10	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V036-A	5	6/28/2011	**1,200**	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	**0.16**	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V036-B	10	6/28/2011	**72,000**	<1.3	<1.3	<6.7	<6.7	<6.7	<0.54	**4.8**	<13	<6.7	<6.7	<6.7	<1.3	<6.7	<6.7	<1.3	<13	<6.7	<67	<1.3
OS-V037-A	5	6/28/2011	**52,000**	<0.13	<0.13	<0.67	<0.67	<0.67	<0.05	**0.58**	<1.3	<0.67	<1.3	<0.67	<0.13	<0.67	<0.67	<0.13	<1.3	<0.67	<6.7	<0.13
OS-V037-B	10	6/28/2011	**99,000**	<1	<1	<5	<5	<5	<0.40	**31**	<10	<5	<5	<5	<1	<5	<5	<1	<10	<5	<50	<1
OS-V038-A	5	6/29/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V038-B	10	6/29/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V039-A	5	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V039-B	10	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V040-A	5	6/27/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V040-B (1PV)	10	6/27/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V040-B (3PV)	10	6/27/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V040-B (7PV)	10	6/27/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V041-A	5	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V041-B	10	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V042-A	5	6/27/2011	**2,000**	<0.20	<0.20	<1	<1	<1	<0.08	<0.20	<2	<1	<1	<1	<0.20	<1	<1	<0.20	<2	<1	<10	<0.20

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Former CENCO Refinery
Santa Fe Springs, CA

Sample ID	Sample Depth (feet bgs)	Sample Date	TPH-g	PCE	TCE	1,1-DCE	1,3,5-TMB	1,2,4-TMB	VC	B	T	E	X	nPRO	CBNZ	ISO-P	MC	NAP	DIPE	MTBE	TBA	Chloroform
All units in µg/L																						
OS-V042-B	10	6/27/2011	**2,700**	<0.40	<0.40	<2	<2	<2	<0.16	<0.40	<2	<2	<2	<2	<0.40	<1	<2	<0.40	<4	<2	<20	**0.59**
OS-V042-B (DUP)	10	6/27/2011	**3,100**	<0.40	<0.40	<2	<2	<2	<0.16	<0.40	<2	<2	<2	<2	<0.40	<1	<2	<0.40	<4	<2	<20	<0.40
OS-V042-B (CONF)	10	6/27/2011	**3,400**	<0.69	<0.55	<0.40	<0.50	<0.50	<0.26	<0.32	<0.38	<0.44	<0.88	NA	<0.47	NA	<0.35	NA	<0.42	<0.37	<0.61	<500
OS-V043-A	5	6/27/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V043-B	10	6/27/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V044-A	5	6/27/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V044-B	10	6/27/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V045-A	5	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V045-B	10	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V046-A	5	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V046-B	10	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	**0.19**
OS-V046-B (DUP)	10	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	**0.17**
OS-V047-A	5	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V047-B	10	6/28/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V048-A	5	6/27/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V048-B	10	6/27/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V049-A	5	6/27/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10
OS-V049-B	10	6/27/2011	<200	<0.10	<0.10	<0.50	<0.50	<0.50	<0.04	<0.10	<1	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<1	<0.50	<5	<0.10

NOTES:
PCE - Tetrachloroethylene
TCE - Trichloroethylene
c1,2-DCE - cis-1,2-Dichloroethene
t1,2-DCE - trans-1,2-Dichloroethene
1,1-DCE - 1,1-Dichloroethene
1,2-DCA - 1,2-Dichloroethane
1,3,5-TMB - 1,3,5-Trimethylbenzene
1,2,4-TMB - 1,2,4-Trimethylbenzene
VC - Vinyl Chloride
B- Benzene
T - Toluene
E - Ethylbenzene
X - Xylenes, total
sBUT - sec-Butylbenzene
nPRO - n-Propylbenzene
CBNZ - Chlorobenzene
1,1 DCA - 1,1-Dichloroethane
ISO-P - Isopropylbenzene
MC - Methylene Chloride
NAP - Naphthalene
TRIM - Trichlorofluoromethane

Table I
Summary of Total Petroleum Hydrocarbon (TPH) and VOC Results
Former CENCO Refinery
Santa Fe Springs, CA

Sample ID	Sample Depth (feet bgs)	Sample Date	TPH-g	PCE	TCE	1,1-DCE	1,3,5-TMB	1,2,4-TMB	VC	B	T	E	X	nPRO	CBNZ	ISO-P	MC	NAP	DIPE	MTBE	TBA	Chloroform
All units in µg/L																						

DIPE - Diisopropyl Ether (DIPE)
MTBE - Methyl-tert-Butyl Ether (MTBE)
TBA - tert-Butyl Alcohol (TBA)
TPHg - Total Petroleum Hydrocarbons, gasoline range
ND - Not Detected above laboratory detection limits
ug/L - Micrograms per litre
NA - Information not available
- - Not Tested
J - Indicates concentration above method detection limit but below practical quantitation limit
(DUP) - duplicate sample
(CONF) - confirmation sample; analyzed by EPA Method TO-15

SOURCE OF BASE MAP

U.S. GEOLOGICAL SURVEY, 7.5 MIN QUAD., WHITTIER, CA. 1965, PHOTOREVISED 1981

N
W E
S

SCALE: NOT TO SCALE

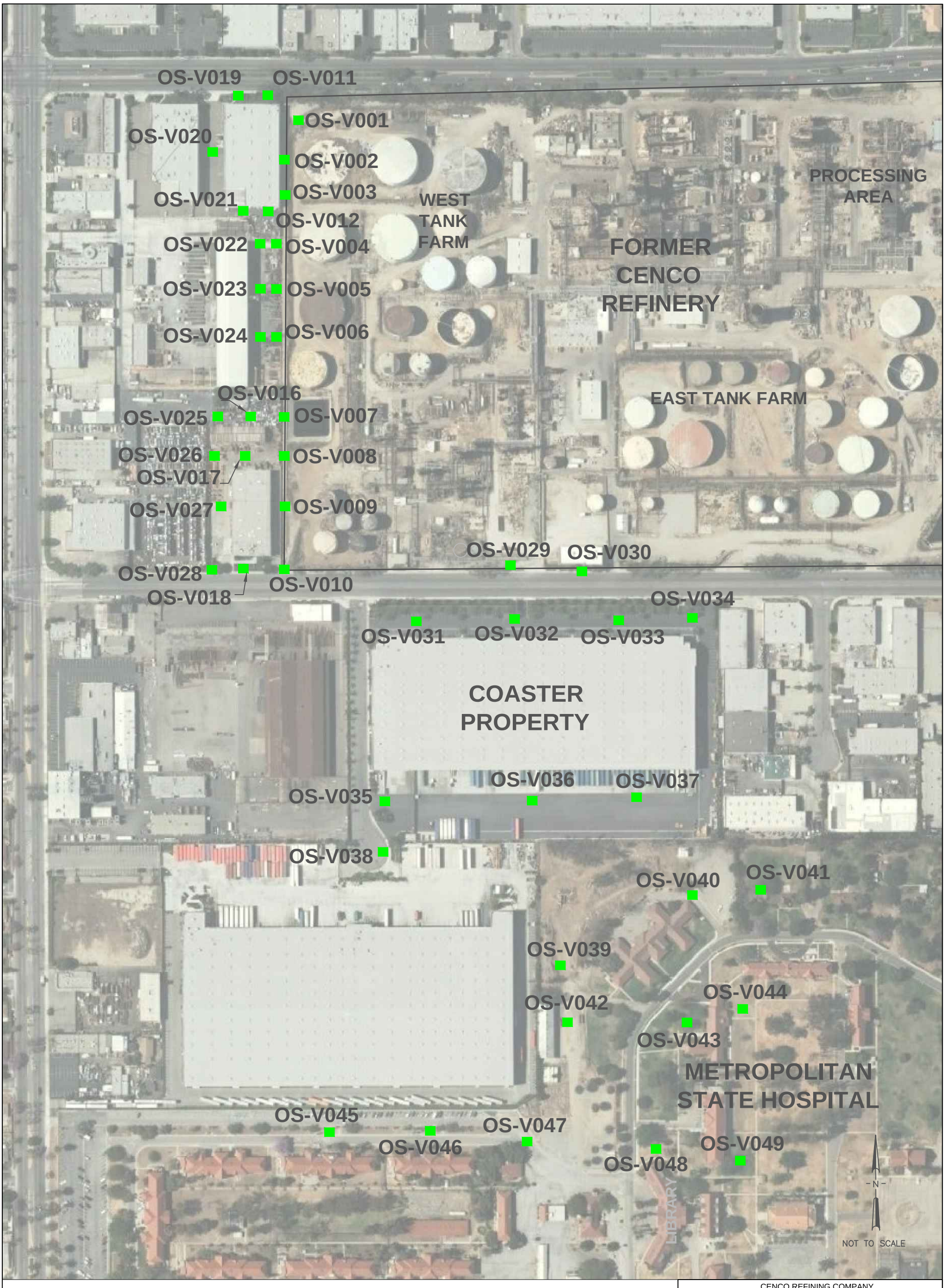
DRAWN BY: RLM REVISION DATE: 8/27/10

CENCO REFINING COMPANY
12345 LAKELAND ROAD
SANTA FE SPRINGS, CALIFORNIA

SITE LOCATION MAP

MUREX environmental, inc

FIGURE
1



LEGEND

OS-V001 SOIL-GAS SAMPLE LOCATIONS

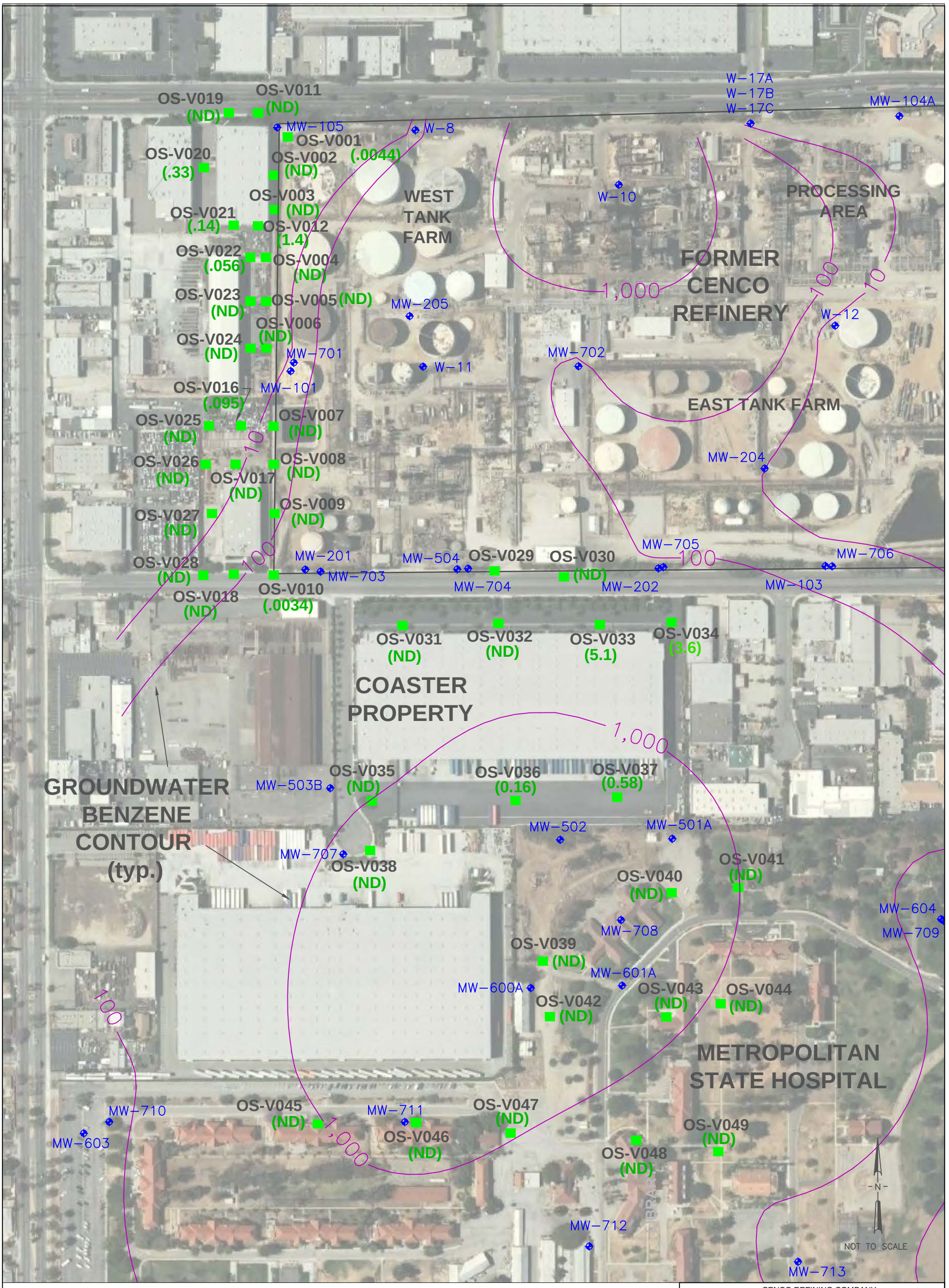
CENCO REFINING COMPANY
12345 LAKELAND ROAD
SANTA FE SPRINGS, CALIFORNIA

SITE PLAN SHOWING SOIL GAS SAMPLING LOCATIONS

MUREX environmental, inc

FIGURE 2

DRAWN BY: RLM REVISED BY: BR REVISION DATE: 11/02/11



LEGEND

OS-V001 (.33) ■	SOIL GAS LOCATION IDENTIFIER BENZENE CONCENTRATION, ug/L
MW-702 ⊕	GROUNDWATER MONITORING WELL LOCATION AND IDENTIFIER
(ND)	NOT DETECTED, SAMPLE BELOW LABORATORY REPORTING LIMITS
— 10 —	BENZENE CONCENTRATION CONTOUR IN GROUNDWATER (µg/L) (DASHED WHERE INFERRED)

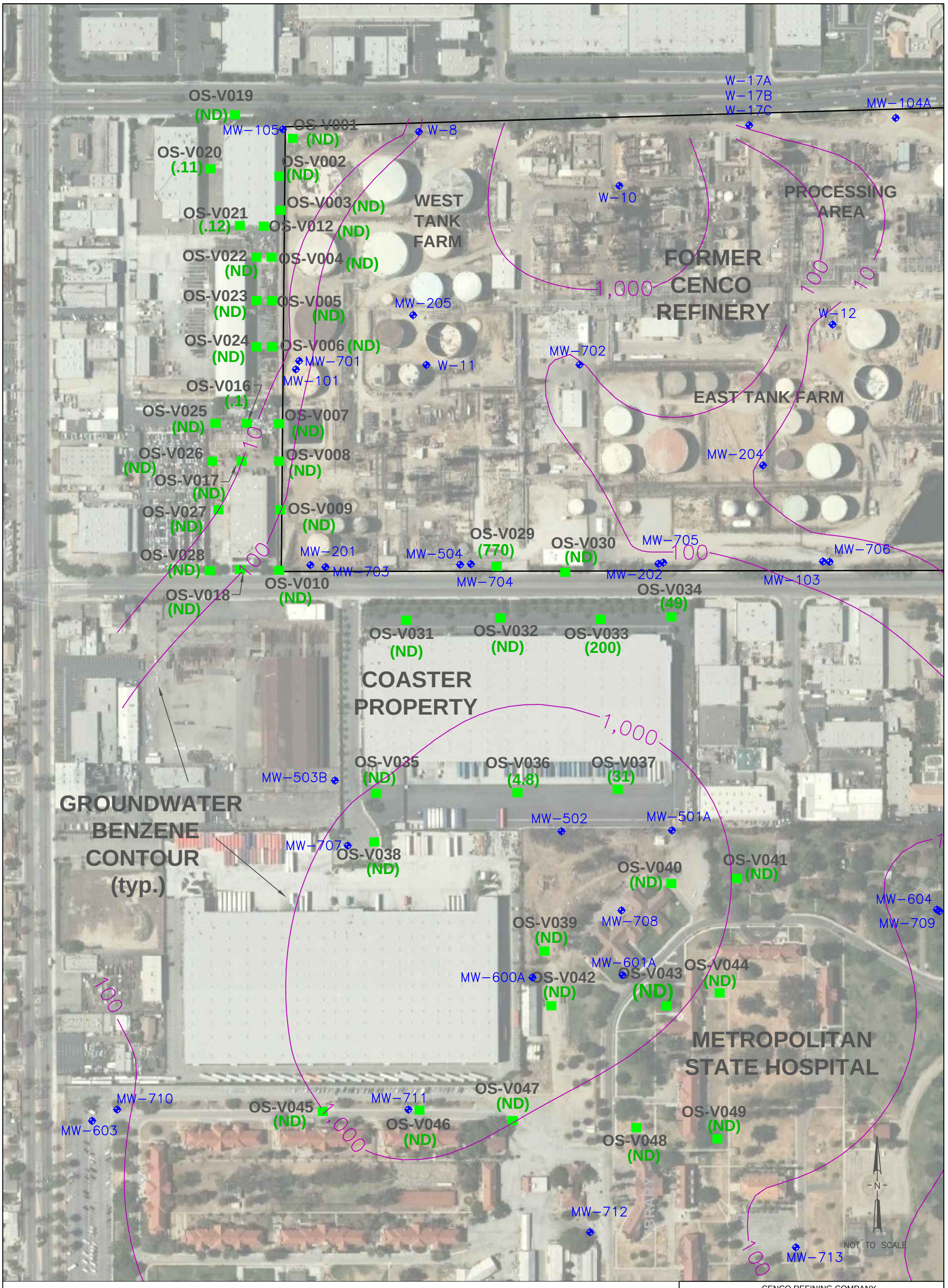
DRAWN BY: RLM REVISED BY: BR REVISION DATE: 11/02/11

CENCO REFINING COMPANY
12345 LAKELAND ROAD
SANTA FE SPRINGS, CALIFORNIA

SITE PLAN SHOWING BENZENE IN SOIL GAS (5 ft-bgs) AND BENZENE CONTOURS IN GROUNDWATER (Q3 2011)

MUREX environmental, inc

FIGURE 3



LEGEND

OS-V001 (.11) ■ — SOIL GAS LOCATION IDENTIFIER, BENZENE CONCENTRATION, ug/L	MW-702 ⊕ — GROUNDWATER MONITORING WELL LOCATION AND IDENTIFIER
(ND) — NOT DETECTED, SAMPLE BELOW LABORATORY REPORTING LIMITS	
— 10 — BENZENE CONCENTRATION CONTOUR IN GROUNDWATER (μg/L) (DASHED WHERE INFERRED)	

DRAWN BY: RLM REVISED BY: BR REVISION DATE: 11/02/11

CENCO REFINING COMPANY
12345 LAKELAND ROAD
SANTA FE SPRINGS, CALIFORNIA

SITE PLAN SHOWING BENZENE IN SOIL GAS (10 ft-bgs) AND BENZENE CONTOURS IN GROUNDWATER (Q3 2011)

MUREX environmental, inc

FIGURE 4

OS-V019 (ND)
OS-V011 (ND)
OS-V001 (1.2)
OS-V020 (ND)
OS-V002 (ND)
OS-V003 (ND)
OS-V021 (ND)
OS-V012 (ND)
OS-V022 (4.5)
OS-V004 (ND)
OS-V023 (ND)
OS-V005 (340)
OS-V024 ND
OS-V006 (ND)
OS-V016 (1.8)
OS-V025 (ND)
OS-V007 (ND)
OS-V026 (ND)
OS-V008 (1,900)
OS-V017 (ND)
OS-V027 (ND)
OS-V009 (ND)
OS-V028 (ND)
OS-V010 (2.3)
OS-V018 (ND)
OS-V029
OS-V030 (ND)
OS-V031 (1,100)
OS-V032 (ND)
OS-V033 (820)
OS-V034 (2,300)
OS-V035 (ND)
OS-V036 (1,200)
OS-V037 (52,000)
OS-V038 (ND)
OS-V039 (ND)
OS-V040 (ND)
OS-V041 (ND)
OS-V042 (2,000)
OS-V043 (ND)
OS-V044 (ND)
OS-V045 (ND)
OS-V046 (ND)
OS-V047 (ND)
OS-V048 (ND)
OS-V049 (ND)

MW-105
MW-101
MW-201
MW-703
MW-504
MW-704
MW-205
MW-701
MW-702
MW-503B
MW-707
MW-502
MW-501A
MW-600A
MW-601A
MW-708
MW-710
MW-603
MW-711
MW-712
MW-713
MW-204
MW-705
MW-202
MW-103
MW-706
MW-104A
W-8
W-10
W-11
W-12
W-17A
W-17B
W-17C

WEST TANK FARM
PROCESSING AREA
FORMER CENCO REFINERY
EAST TANK FARM
COASTER PROPERTY
METROPOLITAN STATE HOSPITAL
LIBRARY

GROUNDWATER TPHg CONTOUR (typ.)

5
10
15
20
25
30

NOT TO SCALE

LEGEND

OS-V001 (2.3) — SOIL GAS LOCATION IDENTIFIER, TPH CONCENTRATION, ug/L

MW-702 — GROUNDWATER MONITORING WELL LOCATION AND IDENTIFIER

(ND) — NOT DETECTED, SAMPLE BELOW LABORATORY REPORTING LIMITS

— 10 — TPHg CONCENTRATION CONTOUR IN GROUNDWATER (µg/L) (DASHED WHERE INFERRED)

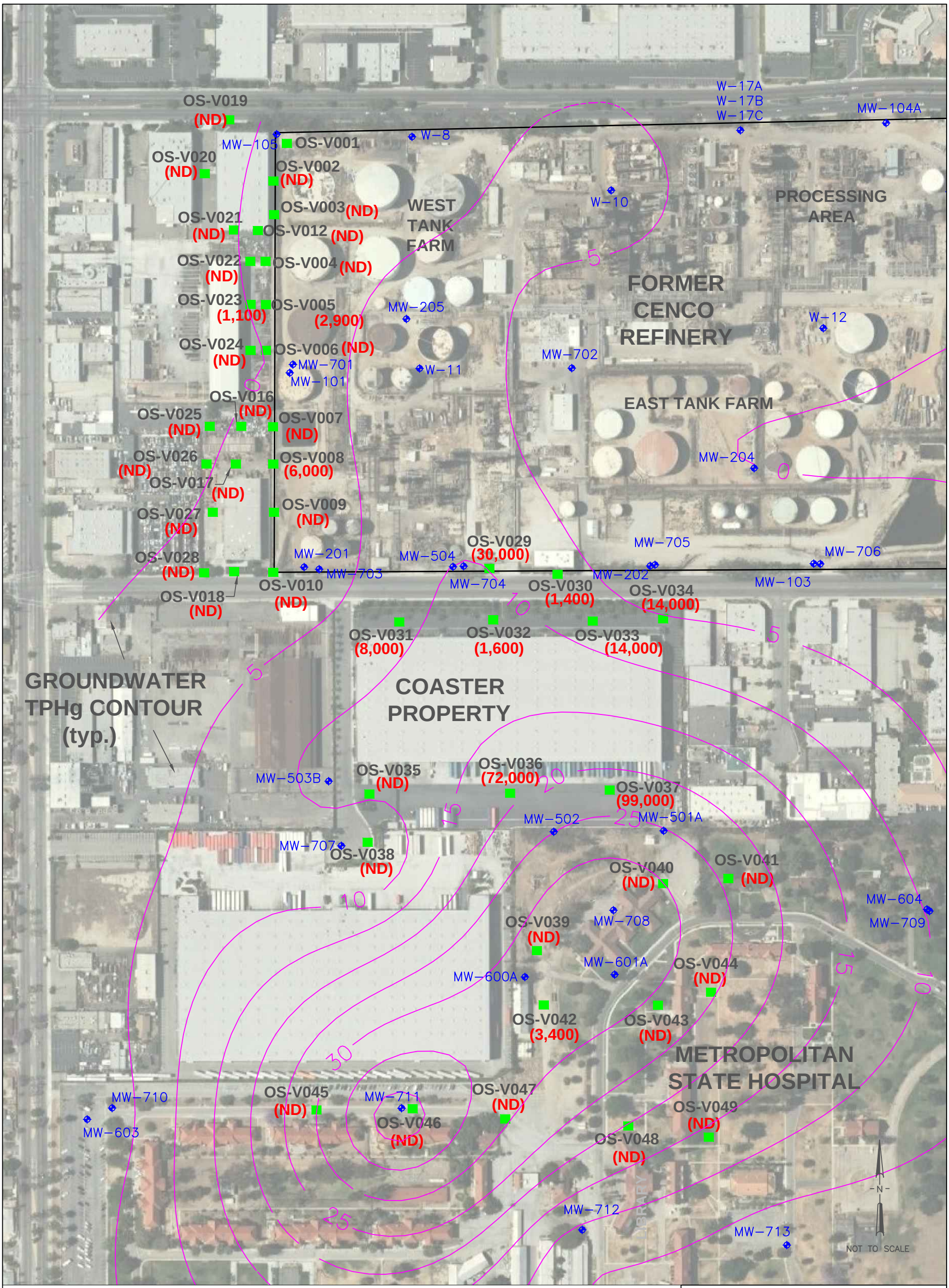
DRAWN BY: RLM REVISED BY: BR REVISION DATE: 11/02/11

CENCO REFINING COMPANY
12345 LAKELAND ROAD
SANTA FE SPRINGS, CALIFORNIA

SITE PLAN SHOWING
TPHg IN SOIL GAS (5 ft-bgs) AND
TPHg CONTOURS IN
GROUNDWATER (Q3 2011)

MUREX environmental, inc

FIGURE
5



LEGEND

OS-V001 (1,600) — SOIL GAS LOCATION IDENTIFIER, TPH CONCENTRATION, ug/L

MW-702 — GROUNDWATER MONITORING WELL LOCATION AND IDENTIFIER

(ND) — NOT DETECTED, SAMPLE BELOW LABORATORY REPORTING LIMITS

— 10 — TPHg CONCENTRATION CONTOUR IN GROUNDWATER (µg/L) (DASHED WHERE INFERRED)

DRAWN BY: RLM REVISED BY: BR REVISION DATE: 11/02/11

CENCO REFINING COMPANY
12345 LAKELAND ROAD
SANTA FE SPRINGS, CALIFORNIA

SITE PLAN SHOWING
TPHg IN SOIL GAS (10 ft-bgs) AND
TPHg CONTOURS IN
GROUNDWATER (Q3 2011)

MUREX environmental, inc

FIGURE
6

Appendix A

California Regional Water Quality Control Board
Los Angeles Region

320 West Fourth Street, Suite 200, Los Angeles, California 90013
(213) 576-6600 • Fax (213) 576-6640
http://www.waterboards.ca.gov/losangeles

Linda S. Adams
Acting Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

April 13, 2011

Mr. Mike Barranco
Lakeland Development Company
12345 Lakeland Road
Santa Fe Springs, California 90670

SUBJECT: APPROVAL OF WORK PLAN FOR OFF-SITE SOIL GAS SURVEY, PURSUANT TO CALIFORNIA WATER CODE SECTION 13304 CLEANUP AND ABATEMENT ORDER NO. 97-118

SITE: FORMER POWERINE / CENCO REFINERY, 12345 LAKELAND ROAD, SANTA FE SPRINGS, CALIFORNIA, (SCP NO. 0318A, SITE ID NO. 2040071)

Dear Mr. Barranco:

Regional Board staff have received and reviewed the *Addendum to the Revised Off-Site Soil Gas Survey Workplan* (Work Plan) for the Site. The Work Plan was prepared and submitted on your behalf by Murex Environmental, and was received by the Regional Board on September 3, 2010. Appendix A of the Work Plan is *The Revised Off-Site Soil Gas Survey Workplan* (dated August 14, 2007) which could not be implemented due to funding constraints that have since been resolved. The Work Plan was submitted in response to the Regional Board's July 20, 2010 directive letter pursuant to California Water Code (CWC) section 13304 Cleanup and Abatement Order No. 97-118.

An oil refinery was operated at the Site from the 1930's until 1995 and the surrounding properties are currently used for commercial and industrial purposes. The refinery operations resulted in impact to the subsurface; primarily with petroleum hydrocarbons. The Work Plan proposes to collect soil vapor samples at 5- and 10-foot depths at 28 locations west, and 21 locations south, of the former refinery. The purpose of this work is to determine if volatile organic compound (VOC) impacts in soil vapor beneath the former refinery extend off-site to the west and south. The Work Plan is hereby approved as proposed.

Prior to the commencement of any field work, you must develop a site-specific Health and Safety Plan (H&SP) in accordance with section 5192 of the California Code of Regulations (CCR), title 8 and submit to the Regional Board project staff. The jurisdictional agency, California Occupational Safety and Health Administration (Cal-OSHA), may inspect the field activities.

Pursuant to section 13304 of the CWC and Order No. 97-118, you are required to submit a technical report of the soil gas survey results, to the Regional Board by **July 15, 2011**, for our review and approval. The new due date is an amendment to the existing Cleanup and Abatement Order No. 97-118, issued August 26, 1997.

The Regional Board requires you to include a perjury statement in all work plans and reports submitted under Cleanup and Abatement Orders. The perjury statement shall be signed by a senior authorized representative at your company (and not by a consultant). The statement shall be in the following format:

"*I [NAME], do hereby declare, under penalty of perjury under the laws of the State of California, that I am [JOB TITLE] for [NAME OF RESPONSIBLE PARTY\DISCHARGER], that I am authorized to attest to the veracity of the information contained in the report(s) described herein, and that the information contained in [NAME AND DATE OF REPORT] is true and correct, and that this declaration was executed at [PLACE], [STATE], on [DATE].*"

The State Water Resources Control Board (State Water Board) adopted regulations requiring the electronic submittals of information over the internet using the State Water Board GeoTracker data management system. You are required not only to submit hard copy reports required in this Order, but also to comply by uploading all reports and correspondence prepared to date on to the GeoTracker data management system. The text of the regulations can be found at the URL: http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/esi_regs.shtml.

Pursuant to section 13350 of the CWC, failure to submit the required technical report by **July 15, 2011**, or failure to comply with provisions of Cleanup and Abatement Order No. 97-118, may result in civil liability penalties administratively imposed by the Regional Board in an amount up to five thousand dollars ($5,000) for each day the technical report is not received and without further warning.

Should you have any questions related to this project, please telephone Don Indermill, of my staff, at (213) 576-6811, or email him at dindermill@waterboards.ca.gov.

Sincerely,

for

Samuel Unger, P.E.
Executive Officer

cc: Jeremy Squire, Murex Environmental
Jeff Hawkins, Isola Law Group
Steve Hariri, DTSC, Cypress

California Regional Water Quality Control Board
Los Angeles Region

320 West Fourth Street, Suite 200, Los Angeles, California 90013
(213) 576-6600 • Fax (213) 576-6640
http://www.waterboards.ca.gov/losangeles

Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

August 30, 2011

Mr. Mike Barranco
Lakeland Development Company
12345 Lakeland Road
Santa Fe Springs, California 90670

SUBJECT: APPROVAL OF TIME EXTENSION FOR SUMITTAL OF REPORT OF SOIL GAS SURVEY PURSUANT TO CALIFORNIA WATER CODE SECTION 13304 CLEANUP AND ABATEMENT ORDER NO. 97-118

SITE: FORMER POWERINE / CENCO REFINERY, 12345 LAKELAND ROAD, SANTA FE SPRINGS, CALIFORNIA, (SCP NO. 0318A, SITE ID NO. 2040071)

Dear Mr. Barranco:

Regional Board staff has reviewed the time extension request, dated August 10, 2011, submitted by you for the above-referenced site. The letter requests a due date extension for the submittal of the Report of Soil Gas Survey (Report). The initial due date for submitting the Report as required in the Regional Board's Work Plan Approval Letter, dated April 13, 2011, was July 15, 2011. A subsequent letter from the Regional Board extended the due date to August 15, 2011. Your letter explains that all the proposed soil gas sampling has been done except for locations on two off-site properties. The Regional Board sent the owners of the two properties letters requesting access and you recently negotiated access arrangements with them.

The reason for the requested time extension is that your consultant has been further delayed in getting access to the two remaining properties and additional time is now required to perform the work and finalize the Report for submission to the Regional Board. After reviewing your request and file documents for this site, Regional Board staff hereby grants this extension from August 15, 2011 to **November 15, 2011** to submit the Report. The due date extension is an amendment to the Work Plan Approval Letter issued by this Regional Board on April 13, 2011 (under existing Cleanup and Abatement Order 97-118 per California Water Code (CWC) section 13304).

Pursuant to section 13350 of the CWC, failure to submit the required technical report by the specified due date may result in the imposition of civil liability penalties by the Regional Board, without further warning, of up to five-thousand dollars ($5,000) per day for each day the technical report is not received after the above due date.

If you have any questions, please contact my staff, Mr. Don Indermill, at (213) 576-6811 or dindermill@waterboards.ca.gov.

Sincerely,

Samuel Unger

Samuel Unger, P.E.
Executive Officer

Appendix B

Soil Vapor Standard Operating Procedures Fulfilling CA-EPA (DTSC) Soil Gas Advisory

Revision 5

December 2008

Prepared by:

H&P Mobile Geochemistry, Inc.

Carlsbad, California

Soil Gas Sampling Procedures

Probe Construction and Insertion

Soil Vapor Implants

At each vapor probe location, H&P's truck-mounted hydraulic direct push rig may be used to advance interconnected 4 ft. lengths of 1.5" stainless steel probe rod to the desired probe depth. The rod is then removed and 1/8" (or ¼" if requested) nylon tubing with a small plastic airstone filter attached to the end is inserted into the open borehole. The probe is gently lifted up approximately 6" and sand is poured down the borehole to encase the filter with 1' of sandpack. Approximately 1' of granular bentonite is then poured down the borehole and hydrated to seal the probe. The SV well can then be completed to the surface with hydrated bentonite or additional implants can be "nested" in the boring at desired depths as it is built to the surface. In unstable soil conditions, the implant and materials can be inserted into the probe rod as it is retracted.

The probe is allowed to set for 30 minutes prior to sampling to allow the bentonite time to properly seal.

Post Run Tubing (PRT) Soil Vapor Sampling

Soil vapor samples are obtained by using a 1.5" O.D. PRT (post run tubing) point holder and a hardened stainless steel drop-off point. The point holder is threaded onto the leading end of a 1.5" O.D. probe rod and advanced to depth using H&P's direct push rig. Once the desired depth is reached, the probe rod is retracted slightly to disengage the expendable point, exposing the vapor sampling port. A 3/8" PRT fitting connected to 1/8" (or ¼" if requested) nylon tubing is inserted into the rod and lowered to the bottom fitting. The tubing is then threaded onto the drop-off point holder by applying downward pressure on the tubing while rotating. A small rubber o-ring on the PRT fitting ensures an airtight seal. Hydrated bentonite is placed around the drive rod at the ground surface to prevent ambient air intrusion from occurring.

The probe is allowed to set for 20 minutes prior to sampling to allow the bentonite time to properly seal.

Manually-Driven Probes

H&P's manually driven soil vapor probes are constructed of 0.625” outside diameter steel and equipped with a hardened steel tip. The probes can reach a depth of 5’ below ground surface. An inert 1/8” nylon tubing is threaded down the center of the probe and connected to a sampling port just above the tip. This internal sample tubing design eliminates any contact between the sample port and the gas sample.

The probe is driven into the ground by an electric rotary hammer. Once inserted to the desired depth, the probe is rotated approximately 3 turns to open the tip and exposes the vapor sampling ports. This design prevents clogging of the sampling ports and cross-contamination from soils during insertion. Hydrated bentonite is placed around the drive rod at the ground surface to prevent ambient air intrusion from occurring.

The probe is allowed to set for 20 minutes prior to sampling to allow the bentonite time to properly seal.

In stable soil conditions, the manually driven probe rods may also be used to set soil vapor implants. With a hardened 1” steel tip on the end of the rod, the probe is driven to depth (usually 5’ or less). The rod is then removed and 1/8” (or ¼” if requested) nylon tubing with a small plastic airstone filter attached to the end is inserted into the open borehole. The probe is gently lifted up approximately 6” and sand is poured down the borehole to encase the filter with 1’ of sandpack. Approximately 1’ of granular bentonite is then poured down the borehole and hydtrated to seal the probe. The SV well can then be completed to the surface with hydrated bentonite.

The probe is allowed to set for 30 minutes prior to sampling to allow the bentonite time to properly seal.

Soil Gas Sampling

Soil vapor is withdrawn from the end of the inert nylaflow tubing that runs from the sampling tip to the surface using a 20 to 60 cubic centimeter (cc) syringe or gas tight canister (Summa) connected via an on-off valve (see diagram). The probe tip and sampling tubing is nominally purged of three to five internal dead volumes, or based upon a pre-determined purge volume established by a purge volume test described below. A sample of in-situ soil vapor is then withdrawn and immediately transferred to the mobile lab for analysis within minutes of collection. The use of small calibrated syringes allowed for careful monitoring of purge and sample volumes. This procedure ensures adequate sample flow is obtained without excessive pumping of air or introduction of surface air into the sample.

For off-site analysis, samples are collected in canisters or in tedlar bags when allowed. Samples collected in tedlar bags for VOC analysis are either analyzed on the same day or transferred to a canister.

Purge Volume Test

If required, a site specific purge volume test is conducted at the beginning of the soil gas survey to purge ambient air from the sampling system. Three different volumes are sampled (nominally 1, 3, 7 purge volumes) and analyzed immediately to determine the volume amount with the highest concentration. Therefore, the optimum purge volume is achieved and used during the entire site investigation.

Use of Tracer Compound to Ensure Probe Seal Integrity

A tracer compound, typically difluoroethane, iso-propanol, or butane, is used to test for leaks around the probe barrel at the ground surface and in the sampling system. The tracer is placed around the base of the probe barrel and at the top of the probe barrel during sample collection. If the tracer is detected per CA-EPA advisory specifications, another sample is collected.

Sample Flow Rate

Sample collection is timed so that the flow rate does not exceed 200 ml/per minute. This is accomplished by withdrawing the plunger on the 60 cc syringe at a constant rate for 20 seconds. The collector notes the collection time on a logsheet, and also records any resistance to sample flow that is felt on the syringe during collection.

Summa Canister

Summa canisters are connected to the end of the nylaflow tubing to the same three way valve used with the syringe. A choke is placed on the canister to ensure that the flow rate is no more than 200 ml/ per minute into the summa canister.

Field Records

The field technician maintains a logsheet summarizing:

- Sample identification
- Probe location
- Date and time of sample collection
- Sampling depth
- Identity of samplers
- Weather conditions
- Sampling methods and devices
- Soil gas purge volumes
- Volume of soil gas extracted
- Observation of soil or subsurface characteristics (any condition that affects sample integrity)
- Apparent moisture content (dry, moist or saturated etc.) of the sampling zone
- Chain of custody protocols and records used to track samples from sampling point to analysis.

Analytical Methodology

The following analytical protocols fulfills the both the CA-EPA advisory (2003) and LA-RWQCB soil gas analytical guidelines (1997).

Operating Conditions and Instrumentation

Volatile Organic Compounds (VOCs) by EPA 8260

Instrument: Hewlett-Packard 6890(6850)/5973 or 5890/5972 GCMS
Column: 25 meter HP-624, 0.20mm x 1.0u. capillary.
Carrier flow: Helium at 1.0 ml/min.
Detectors: Quadrupole MS, full scan mode
Concentrator: Tekmar 3000/Solatek 72

Volatile Organic Compounds (VOCs) by EPA TO-14 or TO-15

Instrument: Hewlett-Packard 6850/5973
Column: 60 meter HP-624, 0.32mm x 1.8u. capillary.
Carrier flow: Helium at 3.0 ml/min.
Detectors: Quadrupole MS, full scan mode
TO-14 Instrumentation: Entech 7100 Air Concentrator/Entech 7300 Autosampler

Fixed and Biogenic Gases (O2, CO2, & Methane)

Instrument: SRI 8610 or Carle AGC 311 Gas Chromatograph
Column: 6 foot CTR
Carrier flow: Helium at 15 ml/min.
Detectors: Thermoconductivity (TCD) for O2 & CO2.

Detectors: Flame ionization detector (FID) for methane.

Hydrogen Sulfide

Instrument: Jerome 631x
Detectors: Gold-film

Standard Preparation

Primary (stock) standards: Made from certified neat components or from traceable standards purchased from certified suppliers.

Secondary (working) Standards: Made by diluting primary standard. Typical concentrations are 1ug/ml, 10 ug/ml, and 50 ug/ml.

Laboratory Check Samples are prepared at the midpoint concentration from a standard purchased from a source different than the primary standards.

Lot numbers and preparations of all standards are recorded on a log sheet and kept in the mobile laboratory.

Gas Standards for TO-14A/15 analysis purchased from Spectra Gases, Branchburg, N.J. diluted from 1.0 ppmv to 10ppbv (for targets) and 1.0ppmv to 100ppbv (internal standards and surrogates

Initial Multi-Point Calibration Curve

An initial calibration curve of a minimum of 3 points is performed either:

- At the start of the project.
- When the GC column or operating conditions have changed
- When the daily mid-point calibration check cannot meet the requirements as specified below.
- For TO-15 a five point calibration is used.

Calibration curves for each target component are prepared by analyzing low, mid, and high calibration standards covering the expected concentration range. The lowest standard concentration will not exceed 5 times the reporting limit for each compound.

A linearity check of the calibration curve for each compound is performed by computing a correlation coefficient and an average response factor. If a correlation coefficient of 0.990 or a percent relative standard deviation (%RSD) of $\pm$ 15% is obtained, an average response factor is used over the entire calibration range. If the linearity criteria are not obtained, quantitation for that analyte is performed using a calibration curve.

After each initial multi-point calibration, the validity of the curve is further verified with a laboratory control standards (LCS) prepared at the mid-point of the calibration range. The LCS includes all target compounds and the response factor (RF) must fall within $\pm$ 20% of the factor from the initial calibration curve.

Continuing Calibration (Daily Mid-point Calibration Check)

Continuing calibration standards prepared from a traceable source are analyzed at the beginning of each day. Acceptable continuing calibration agreement is set at $\pm$ 20% to the average response factor from the calibration curve, except for freon, chloroethane, and vinyl chloride when a 25% agreement is required. When calibration checks fall outside this acceptable range for analytes detected on the site, corrective action, consisting of verification of the standard and/or a new calibration curve for the analytes out of specifications is performed by the on-site chemist.

The continuing calibration includes all compounds expected or detected at the site in addition to any specific compounds designated in the project workplan.

Detection Limits

Reporting limits for this program are defined as 5 times lower than the lowest concentration standard of the calibration curve, as follows:

Compound	Detector	Report Limit
VOCs by TO-14A/15	Mass Spec	1.0 to 5 ppbv
VOCs	Mass Spec	0.1 to 1 ug/l-vapor
Methane	FID	10 ppmv
Fixed Gases	TCD	0.1% by vol
H2S	Gold Film	0.10 ppmv

Injection of Soil Gas Samples

Vapor samples are withdrawn from the probe sampling syringe with a 5 cc syringe and injected with surrogates into a purge & trap instrument for VOC analysis. Separate aliquots are directly injected into gas chromatographs for fixed gases and methane analysis. The injection syringe is flushed 2 times with the sample prior to injection. Injection syringes are flushed several times with clean air or discarded between injections.

TO-14A/15 samples are taken into Summa or similar passivated canisters. Holding time for these canisters is 30 days.

Laboratory Data Logs

The field chemist maintains injection and sample analysis records including date and time of analysis, sampler's name, chemist's name, sample ID number, concentrations of compounds detected, calibration data, and any unusual conditions.

Quality Control Procedures

Compliance With Standards

Sampling and analytical procedures complied with the American Society for Testing and Materials' *Standard Guide for Soil Gas Monitoring in the Vadose Zone* (ASTM D5314-93), the LA-RWQCB Soil Gas Guidelines (Feb 1997 version), the San Diego County SAM Soil Gas Guidelines (October, 2001), and the Advisory – Active Soil Gas Investigations, DTSC/LARWQCB (Jan 28, 2003).

Sampling Quality Control

Method Blanks

Prior to sampling each day, all components of the sampling system are checked for contamination by drawing ambient air from above ground through the sampling equipment, and injecting a sample into a gas chromatograph. The analysis results are compared to that of the ambient air and recorded in the data tables as blanks.

Sample Quality Control

Each sample is given a unique identification number specifying location and depth. Purge and sample volumes are monitored closely using small calibrated syringes to assure a proper flow of soil gas. This ensures a representative sample is obtained from the sample zone without excessive pumping, which could result in sampling of surface air.

Decontamination Procedures

To minimize the potential for cross-contamination between sites, all external soil vapor probe parts are wiped or washed cleaned of excess dirt and moisture with solvents or de-ionized water as appropriate. The probe's internal nylaflow tubing is purged with clean air between sampling locations or replaced as necessary. Sampling syringes are flushed with clean air after each use or replaced.

Corrective Action

Corrective action is taken when unexpected contaminant levels are detected. First duplicate samples are taken to verify the initial detection of petroleum hydrocarbons. If contamination is suspected, then the sample probes are disassembled, wiped cleaned of excess dirt and moisture, rinsed with

deionized water, washed with Alconox and water, and rinsed again with deionized water. The sample tubing in the probe is replaced. Contaminated sampling syringes are discarded.

Analytical Quality Control

Method Blanks

Method blanks are performed at the start of each day by drawing clean air through the sampling equipment and analyzing. These blanks verify all components of the sampling and analytical system are free of contamination. Additional blanks are performed more often as appropriate depending upon the measured concentrations, at a minimum 1 every 20 samples. The results of all blank analyses are recorded in the data tables. If a blank shows a measurable amount of any target compound, the on-site chemist will investigate and determine the source, and resolve the contamination problem prior to analyzing any samples.

Duplicate Samples

Duplicate (repetitive) analysis of a sample is performed when inconsistent data are observed, but at least one every 20 samples. Because soil vapor duplicates can vary widely, nominal relative percent difference (RPD) acceptance criteria is $\pm$ a factor of 2.

Continuing Calibration (Daily Mid-point Calibration Check)

As described on page 5 of this document, continuing calibration standards prepared from a traceable source are analyzed at the beginning of each day.

The continuing calibration includes all compounds expected or detected at the site and any specific compounds designated in the project workplan.

Laboratory Check Samples (LCS)

Laboratory check samples, prepared at the lowpoint concentration from a standard purchased from a source different than the calibration standards, are analyzed at the end of each day if all samples are below detection. Acceptance criteria is $\pm$ 20% from the true value. If the LCS falls outside this acceptance range for analytes detected on site, corrective action, consisting of verification of the standard and/or a new calibration curve for the analytes out of specifications, is performed.

Appendix C